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FOREST PEST MANAGEMENT

IOLOGICAL EVALUATION R2-90-2

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E RIVER NATIONAL FOREST, COLORADO

United States
Department of

Forest Service

Forest Pest Management
Denver Colorado

BIOLOGICAL EVALUATION R2-90-2

PEST CONDITIONS AND POTENTIAL HAZARD TREES IN CHAPMAN CAMPGROUND, CHAPMAN GROUP CAMP AND ELK WALLOW CAMPGROUND, SOPRIS RANGER DISTRICT, WHITE RIVER NATIONAL FOREST, COLORADO

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SUMMARY

In August 1989, a ground survey was run to determine the insect, disease, and hazard tree conditions in three selected campgrounds (Chapman, Chapman Group, and Elk Wallow Campgrounds) on the Sopris Ranger District of the White River National Forest. The campground survey was divided into two portions: a within-campground survey and an outside-campground survey. Regeneration potential was also assessed.

The results of the surveys are presented in Tables 1, 2, and Appendix D. Lodgepole pine dwarf mistletoe (Arceuthobium americanum) was identified as a major disease problem at the Chapman Campground. Locations of the dwarf mistletoe infection centers are mapped and presented in Appendix E.

The average tree hazard rating for each campground was medium. Nineteen high hazard trees were identified in Chapman Campground, two in Chapman Group Camp, and one in Elk Wallow Campground.

Other insect and disease problems were found at generally low levels. The most serious of these were mountain pine beetle and spruce beetle, which in the past have caused significant tree mortality, and the cankers, stem and root decays of aspen, which contribute significantly to tree hazard levels. The impact of other insect and disease pests was largely aesthetic.

Several management alternatives are presented for consideration. A combination of management activities are recommended, including institution of an annual hazard tree evaluation program, selective removal and replacement of dwarf mistletoe infected trees, and the revegetation of sparsely stocked areas. With the exception of trees infested with mountain pine beetle or spruce beetle, we suggest that wherever other insects or diseases do not affect hazard tree conditions, they be left alone as long as possible as part of the natural ecosystem. However, if their incidence increases dramatically (not a likely scenario), then the Forest Pest Management Specialists at the Gunnison Service Center should be contacted. Revegetation of the dwarf mistletoe infested stands may be accomplished by encouraging non-host regeneration and by transplanting non-host stock from commercial sources or from the surrounding stands. Public involvement in the replanting effort is encouraged. Construction of a self-guided interpretive trail would help stimulate interest and involvement in the vegetation management project.

In order to coordinate the above activities, the current vegetation management plan for the campgrounds (originally drafted in 1985) needs to be updated to include plans for dwarf mistletoe and hazard tree management. Specific treatments and a timetable for their accomplishment need to be included, together with plans for continued management of mountain pine beetle and spruce beetle. Effective

development and implementation of the revised vegetation management plan requires the involvement of both the timber and recreation staffs of the Sopris District. The Forest Pest Management Specialists at the Gunnison Service Center are available to provide technical guidance and support.

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INTRODUCTION

In 1985, a Vegetation Management Plan and Environmental Assessment to address an infestation of mountain pine beetle in the lodgepole pine stands of the Chapman and Elk Wallow Campgrounds (Sopris Ranger District, White River National Forest) was prepared and approved. A decision notice and finding of no significant impact was subsequently issued, adopting an intensive management alternative including hazard tree removal, removal of dead and dying beetle infested trees, preventative spraying with Carbaryl, planting, creating small openings, thinning, and limited overstory removal. In December 1988, an additional review of the status of the planned vegetative treatments identified lodgepole pine dwarf mistletoe (Arceuthobium americanum) as an additional factor affecting implementation of the plan (McCarthy 1988). The review recommended that "the District should amend the environmental analysis and vegetative management plan (1985) to reflect the need to manage recreation resources in view of concerns over dwarf mistletoe." As a result of the review, the personnel from the Forest Pest Management Service Center in Gunnison were requested to develop and conduct an intensive survey to identify the location, distribution and severity of the disease, insect and hazard tree conditions in Chapman and Elk Wallow Campgrounds. The survey was run in August 1989. The following biological evaluation details the findings of the survey.

OBJECTIVES

Through the years, various survey techniques have been employed to evaluate hazard trees (Johnson 1981; Sharon and Hubbard 1985), dwarf mistletoe (Hawksworth 1977; Johnson, Hawksworth and Drummond 1980), and root diseases (Bloomberg, Cumberbirch and Wallis 1980; Johnson 1984), but, to date, these surveys have not been combined to present an integrated view of the overall disease situation. The survey method employed in this evaluation sought to provide an estimation of the extent, distribution and severity of dwarf mistletoe, root disease, canker, insect and hazard tree problems both within and immediately surrounding campgrounds. Existing survey methods were combined and revised to meet the above objectives.

METHODS

Each campground survey was divided into two portions a within-campground survey and an outside-campground survey. The within-campground survey was designed to address forest pest and hazard tree conditions within the boundaries of the campground itself. In contrast, the outside-campground survey assessed conditions in the surrounding stands that could impact the management and implementation of disease suppression measures within the campground. Since the objectives of the two surveys differed, separate techniques were employed in each area. To illustrate the layout of the within- and outside-campground plots, a map showing plot locations at the lower loops of Chapman Campground is provided in Appendix A.

Within-Campground Survey

The design of the within-campground survey roughly followed that of the aspen mortality survey developed by Hinds (1976) and the tree hazard survey of Johnson (1981). The survey plots were campsite-centered, in order to better assess tree hazard to occupied areas. Every fifth unit before and after a randomly selected campsite was examined (20% sample). A minimum of three campsites were examined in campgrounds with 15 or fewer units (Elk Wallow Campground). Two types of temporary plots were established:

1. Interior Plots (to determine pest conditions within individual campsites). Using a point located midway between the fire pit and the picnic table as plot center, an 0.05-acre circular plot (26-foot 4-inch radius) was established. All trees over 5" DBH were examined for dwarf mistletoe, root disease, cankers, defect, insect pests and hazard potential (Appendix B). Trees infected with dwarf mistletoe were rated using the 6-class dwarf mistletoe rating system developed by Hawksworth (1977), and hazard trees were rated according to the hazard tree method of Johnson, 1981.

2. Inter-Unit Plots (to determine the condition of trees immediately surrounding the camp units). For each interior plot sampled, an inter- unit plot was also established. Inter-unit plots were located between the current campsite and the previously numbered adjacent campsite, centered on a line between points midway between the fire pit and picnic table of each campsite. Plot size and data recorded was the same as for the interior plots (Appendix B). In addition, for each inter-unit plot, two 1/300 acre plots were established to record regeneration. The centers of the regeneration plots were located 20' to the left and right of the inter-unit plot center, along a line perpendicular to the line joining the two campsites. At each regeneration plot, the numbers and species of trees less than 5" DBH were recorded. The numbers of trees of each species less than and greater than 2' tall was also recorded to determine the relative ability of the regeneration to survive overstory removal.

Outside-Campground Survey

The outside-campground survey was designed to assess dwarf mistletoe, root disease and insect pest conditions in forest stands immediately surrounding the campgrounds. A modified strip-survey was employed. A single survey strip located 1/2 chain from the edge of the campground was run around the campground perimeter. The 1/2 chain distance was established so that the survey would include any dwarf mistletoe infected trees that may disperse seeds into the campground (1/2 chain is the distance within which 90% of the dwarf mistletoe seed is dispersed (Hawksworth and Graham 1963)). Sample points were established at every two chains along the strip. At each sample point, a 20 BA factor prism determined sample trees. All trees over 5" DBH were examined for dwarf mistletoe, root disease, cankers, defect, and insect pests (Appendix C).

RESULTS AND DISCUSSION

Results of the within and outside-campground surveys were tabulated separately. Data from the interior and inter-unit plots were both pooled and tabulated separately. The data from the regeneration plots were pooled to determine the potential for regeneration within the campground boundaries. The complete results of the surveys are listed in Appendix D. Wherever possible, the data is reported as percent infection or by severity index (e.g., Dwarf Mistletoe Rating or Hazard Tree Risk Rating).

Lodgepole pine dwarf mistletoe (Arceuthobium americanum) at the Chapman Campground was the only significant disease problem encountered. Other insect and disease problems in all three campgrounds were minor in both intensity and occurrence. A summary of the dwarf mistletoe levels at the three campgrounds is presented in Table 1. Locations of the dwarf mistletoe infection centers are mapped and presented in Appendix E.

Shoestring root disease (Armillaria sp.), the major root disease problem in the Rocky Mountain region, was not found in its potential hardwood and coniferous hosts. Annosus root disease (Heterobasidion annosum) was likewise absent from its coniferous hosts.

The average tree hazard rating for each campground was medium, ranging from 13.9 to 16.5 (Table 2). Nineteen high hazard trees were encountered in Chapman Campground, two in the Chapman Group Camp, and one at Elk Wallow Campground. The high hazard trees were immediately reported to the Sopris Ranger District.

A description of each recreation area surveyed is presented below, together with the disease, insect, and hazard tree conditions. Detailed information may be found in Appendix D. Maps showing the size and locations of the dwarf mistletoe centers in the Chapman Campground are presented in Appendix E:

Table 1. Dwarf mistletoe evaluations of selected campgrounds on the Sopris Ranger District, White River National Forest.

		% Infection		DMR[a]	
		LPP	Stand	Infected LPP	Stand
Chapman	Inside C.G.[b]	21	19	3.2	0.6
	Outside C.G.	8	6	2.6	0.2
Chapman Group	Inside C.G.	0	0	0	0
	Outside C.G.	0	0	0	0
Elk Wallow	Inside C.G.	0	0	0	0
	Outside C.G.	0	0	0	0

[a]DMR = Hawksworth's (1977) dwarf mistletoe rating

[b]Inside C.G. figures represent pooled interior and inter-unit data

Table 2. Tree hazard evaluations of selected campgrounds on the Sopris Ranger District, White River National Forest.[a]

	Average Hazard Rating[b]	# Of Trees In Hazard Class (%)		
		High	Medium	Low
Chapman	13.9	19 (6)	223 (69)	85 (25)
Chapman Group	15.0	2 (11)	12 (67)	4 (22)
Elk Wallow	16.5	1 (6)	15 (83)	2 (11)

[a]The hazard ratings presented are not recommendations for action. They are professional estimates of the probability of tree failure and are to be used by the land manager during the decision-making process for management plans in recreation areas. Figures represent pooled interior and inter-unit data.

[b]Hazard ratings determined by Johnson's tree hazard evaluation procedure (1981). High= 21-27; Medium= 10-20; Low= 0-9.

1. Chapman Campground - 83 camp units. The dominant tree species is lodgepole pine, although spruce, aspen, white fir and Douglas-fir are also present. Stocking levels are moderate; adequate shading and screening are present in most of the campsites. Regeneration levels are moderate to high, with an average of 992 trees per acre. However, much of this regeneration is aspen (575 trees per acre). The average tree hazard was rated as medium (13.9). Of the nineteen high hazard trees identified, nine were aspens with internal decay (Phellinus tremulae), and nine were lodgepole pine or aspen with defective (dead or broken) tops. The remaining high hazard tree had been girdled with wire.

   The intensity and severity of the dwarf mistletoe infestations are worse in the lower loops (A-E) than in the upper loops (F-H).

   Dwarf mistletoe centers in the lower loops are both large and widespread. Three major centers were identified. One is located along the road leading to Loop C, one is in the western side of Loop D, and the last is along the northern side of Loop E (Appendix E). Several single isolated infected trees were also noted. Only one major infection center was identified in the upper loops, along the road leading to Loop G. Three isolated infections were also found in Loop F.

   While lodgepole pine dwarf mistletoe was the major disease problem identified in the campground, other insects and diseases were found at generally low levels. The most serious of these were the cankers, stem and root decays of aspen, including Ceratocystis fimbriata (target canker), Phellinus tremulae (white trunk rot), and Ganoderma applanatum (white mottled rot). These diseases were most prevalent in the aspen stands in loops F and G. The major impact of these diseases are in contributing to tree hazard. Western gall rust (Endocronartium harknessii) and spruce broom rust (Chrysomyxa arctostaphyli) were widespread in lodgepole pine and spruce hosts, respectively. The major impact of these diseases, is aesthetic, though large single infections may eventually contribute to tree hazard.

   Mountain pine beetle (Dendroctonus ponderosae), once a major insect problem in the campground, and spruce beetle (Dendroctonus rufipennis), were only occasionally noted. In the course of the survey, four lodgepole pines with mountain pine beetle and two spruce with spruce beetle were identified.

2. Chapman Group Camp - 3 acre developed camp area, no discrete camp units. In this lodgepole pine site, stocking levels are low, with 60 trees per acre. Shading and screening are sparse. Most tent sites are in full sunlight and from most sites, one may easily see across the campground. Regeneration levels are likewise low, consisting of 50 trees per acre of

lodgepole pine (all over two feet tall). Occasional spruce and aspen seedlings were also noted.

While the stocking and regeneration levels are low, the trees that are present are in generally good condition. In contrast with the Chapman Campground, lodgepole pine dwarf mistletoe was absent from the group camp. Root disease, stem decay, cankers, rust disease, bark beetles and defoliating insects were likewise absent. The average hazard rating was medium (15.0), and two high hazard trees were identified. Both had broken tops. Camper abuse (mechanical injury) and compaction (resulting in exposed roots) accounted for most of the remaining hazard potential.

3. Elk Wallow Campground - 7 camp units. Lodgepole pine is mixed with spruce and aspen. The campground is open, with scattered lodgepole pine trees and some clumps of lodgepole. Overall stocking levels are low, with inadequate shading and screening in most of the campsites. Spruce and aspen are found in the vegetation surrounding the campground and along the main road. Regeneration levels are low to moderate, consisting of 150 trees per acre of aspen. Occasional lodgepole pine seedlings were also noted outside the regeneration plots.

   As with the Chapman Group Camp, what few trees are present on the site are in generally good condition. With the exception of one leaning lodgepole pine with internal decay, disease and insect problems, including dwarf mistletoe, were not found. The lodgepole pine was rated as a high hazard tree and reported to the Sopris District for removal. The average tree hazard at Elk Wallow Campground was rated as medium (16.5); most of the tree hazard was due to camper abuse.

MANAGEMENT ALTERNATIVES

1. Do Nothing. Under this alternative, the numbers and severity of hazard trees will continue to increase, along with the probabilities of tree failure, property damage, and personal injury. Expansion of the dwarf mistletoe infection centers in the Chapman Campground will continue as the affected trees decline in health and vigor. In the areas that are not affected by lodgepole pine dwarf mistletoe, mountain pine beetle will again become a threat as the trees get older and larger. Loss of trees to dwarf mistletoe and mountain pine beetle will seriously reduce shading and screening, reducing the aesthetic qualities of the campgrounds. In addition, if the dwarf mistletoe- infected lodgepole pines are not removed, the underlying lodgepole pine regeneration is also likely to become infected and die. Other regeneration, most notably aspen, will eventually replace the lodgepole pine. While initially providing beneficial shading and screening, the susceptibility of aspen to human abuse, cankers and

stem decay (and thus to hazard tree problems) makes the species inappropriate for most campground situations.

2. Reduce Tree Hazard Potential. This alternative involves the implementation of a program of annual inspections to detect and identify hazard trees. The tree hazard evaluation proposed is best accomplished in three steps: identification, documentation, and corrective action. The evaluation is not merely a checkup of tree mortality; identification of hazard trees entails the evaluation of both the probability of failure (tree defect evaluation) and the probability of injury or damage (target evaluation). An appropriate hazard tree sampling system is described by Johnson (1981). A new videotape by Sharon and Steinke (1989), "Tree Health Management: Evaluating Trees For Hazard," is available to help train inspection personnel. In order to reduce liability, complete documentation of all hazard tree inspections is a necessity. Corrective action involves the treatment or removal of hazard trees as soon as possible after an evaluation. Whenever possible, tree removal should be accomplished during the off-season to minimize the impact on recreationists. Treatment of hazard trees (short of removal) may include such treatments as pruning or strengthening of the tree by installation of reinforcing cables or metal rods. Not all defective trees need to be treated or removed; only those whose proximity to a target is such that the risk the tree poses outweighs the benefits it provides. Defective trees that are not removed should be monitored closely, particularly if they are located in areas of intensive use.

3. Remove The Targets. In some cases, the severity of the hazard tree problem and the expense of correcting it is such that closure of the campground or sections of the campground is the only reasonable alternative. We do not believe this is the case in any of the campgrounds we surveyed. On case-by-case basis, it is sometimes appropriate to move potential targets (such as camping pads, latrines or other structures) away from particularly hazardous trees if they need to be retained because of unusual size or value to the site. Again, these measures are not likely to be necessary in the three campgrounds we surveyed.

4. Implement Dwarf Mistletoe Control. Under this alternative, dwarf mistletoe control measures would be undertaken in Chapman Campground. The objective of these measures would be to reduce the negative effects of the disease on tree vigor and longevity and to prevent disease spread into non-infested areas. Detailed guidelines for dwarf mistletoe control in developed recreation areas may be found in Hawksworth and Johnson (1989) and FPM (1990). Appropriate management activities may include:

   a. Broom Pruning - To extend tree life and maintain trees on the site for as long as possible.

   b. Tree Removal - To selectively eliminate infested trees, prevent the buildup of bark beetles, and reduce dwarf mistletoe spread and intensification in the stand.

c. Branch Pruning/Eradication - To reduce or eliminate dwarf mistletoe spread in the stand and improve tree vigor.

d. Thinning - To improve stand growth and tree vigor.

e. Favoring and Planting of Non-Host Conifers and Hardwoods - To eventually replace infected trees with uninfected trees and lessen future spread of dwarf mistletoe.

f. Creation of Buffer Strips - To limit or stop the spread of dwarf mistletoe into a treated area or healthy stand from adjacent infested areas.

g. Application of Ethephon (an ethylene-releasing agent that causes dwarf mistletoe shoots to drop off host trees) - To prevent the spread of dwarf mistletoe seed during establishment of the understory until the infected overstory can be removed.

h. Rotation of Campground Usage - To provide for long-term recovery of heavily infested areas.

Of these measures, tree removal and the creation of buffer strips are the most effective for long-term dwarf mistletoe control. Removal of blocks of trees will be necessary where removal of all infected trees would result in an aesthetically unacceptable situation (such as in the infection centers along Loops D and E). Control treatments are best done in conjunction with a program to replace removed trees. This may be accomplished either by favoring existing regeneration or by active replanting. Tree species that are not susceptible to lodgepole pine dwarf mistletoe, such as spruce and Douglas-fir, should be favored whenever possible. Active replanting is recommended wherever regeneration potential is low or where aspen is the dominant regeneration species. Suitable planting stock may be obtained commercially or from the stands immediately adjacent to the campgrounds. Trees obtained from the latter source may be transplanted by use of a tree spade. When using the tree spade, at least 10 inches of root ball radius is needed for each inch of tree diameter, as measured at the base. Intensive watering of the new transplants is critical. Not all infected trees need be immediately removed. However, if lodgepole pine is planted or allowed to regenerate under an infested overstory, then that overstory should be removed before the new trees reach 10 years of age. If the overstory is heavily infested, applications of ethephon (at 3 to 4-year intervals until the overstory is removed) may be appropriate. Public involvement in the dwarf mistletoe projects is beneficial. To help stimulate this involvement, a self-guided interpretive trail describing the geology, history, wildlife and vegetation of the area may be installed. A brochure or series of information boards to accompany the trail may be developed with the assistance of Forest Pest Management personnel. Vegetation management in the campground may also be discussed, with particular emphasis on the dwarf mistletoe

problem and what is being done about it. Campground hosts may also be used to help spread the word about the projects. Finally, in areas that are replanted, campers may be encouraged to help the regeneration by watering the newly planted trees.

5. Address The Other Insect and Disease Problems. During the surveys,a number of other insect and disease problems were identified in Chapman Campground. Among the endemic insect problems encountered were mountain pine beetle and spruce beetle. The infested lodgepole pines are undoubtedly the remains of the the mountain pine beetle infestation that peaked in the mid-1980's. For the past seven years, preventative spraying with Carbaryl and removal of beetle-infested trees have been practiced in all three campgrounds to deal with the infestation. Under this alternative, the above management activities will be continued as needed. Trees infested with spruce beetle will also be removed.

   Other disease problems identified in the survey included western gall rust of lodgepole pine, cankers, stem and root disease in aspen, and broom rust of spruce. These endemic diseases were found only at Chapman Campground, and at generally low levels. While the primary impact of these diseases is in their contributions to tree hazard, they also impact the aesthetic qualities of the campgrounds. These impacts may be both positive and negative, depending on one's point of view. While some may view infested or diseased trees as an eyesore, others may view the same in a positive light, as part of the natural order of things. As land managers, we agree with the latter point of view. Therefore, where insects and diseases do not cause hazard or tree death, or are not likely to spread, we recommend that the host trees be retained for as long as possible. The annual hazard tree evaluation should be sufficient to keep apprised of the status of the "minor" insect and disease conditions. If the occurrence of these insects or diseases increases dramatically, then the forest pest management specialists at the Gunnison Service Center should be contacted. Again, an interpretive trail may be used to discuss the various roles that insects and diseases play in forest ecosystems . Such information would both educate the public and stimulate a new appreciation for what may previously have been considered an eyesore.

6. Revegetation of Sparsely Stocked Areas. During the survey, several sparsely vegetated areas free from insect and disease problems were identified. These included much of loops A, B and G at the Chapman Campground and most of Chapman Group Camp and Elk Wallow Campground. Under this alternative these areas will be replanted with a mix of blue and Engelmann spruce, Douglas-fir, and lodgepole and ponderosa pine. The objective will be to provide a more diverse, aesthetically pleasing stand. In addition, the mix of species will help to lessen the risk and impact of future insect and disease attacks. As with the revegetation of the dwarf mistletoe infested areas, suitable planting stock may be obtained commercially or from the stands immediately adjacent to the campgrounds. While most of the planting stock will be seedlings,

small numbers of sapling-sized trees may be planted where immediate shading or screening is required. To insure successful regeneration, the trees should be planted in areas that are as protected as possible, away from major foot traffic lanes. The spruce may be planted in the wetter, more shaded sites. Again, campers can be encouraged to help with the revegetation by watering the newly planted trees.

7. A Combination of Alternatives 2, 3, 4, 5 and 6. The above alternatives are not mutually exclusive. They are best used in combination to solve specific problems in many areas.

RECOMMENDATIONS

- Institute an annual hazard tree evaluation and removal program.

- Implement dwarf mistletoe control.

- Revegetate sparsely stocked areas.

- Continue management of mountain pine beetle and spruce beetle.

- Install a self-guided interpretive trail.

- Update the current vegetation management plan.

In a campground situation such as at the Sopris District, the major priority is to create and perpetuate a healthy, diverse forest which is visually pleasing and less prone to damage by insects and disease. The best way to achieve this goal is by applying a variety of management activities to address the hazard tree, insect, and disease situations. Management Alternative 7 is therefore recommended. One specific management activity that is already required (FSM R2 Supp. 93-2331.32) is the institution of an annual hazard tree evaluation and removal program in all of the District's campgrounds. Region 2 Forest Pest Management has provided direction and a form (R2-2300-11a) to help affect the annual safety and health inspection. The forest pest management specialists at the Gunnison Service Center (GSC) are available to provide guidance and to train district personnel in the recognition of potentially hazardous trees. Another management activity that is needed is the selective removal and replacement of dwarf mistletoe-infected trees in Chapman Campground. Layout of treatment blocks and selection of trees to be removed would best involve both timber and recreation staffs from the Sopris District, as well as the forest pest management personnel of the GSC. Final selection of trees to be treated or removed should take place at the campgrounds, with all staffs present. Replanting after removal of the dwarf mistletoe infested trees should take place as soon as is operationally feasible, and may simultaneously include revegetation of the sparsely stocked areas described previously. Again, the revegetation may be best accomplished by using transplants and tree spade stock from the surrounding stands. Involvement of the public (from the public schools, Colorado Mountain College, etc.) in the

replanting efforts may be solicited and encouraged. Continued interest and involvement of the public in the vegetation management efforts may also be stimulated by the installation of a self-guided interpretive trail describing the geology, history, wildlife and vegetation of the area.

In order to coordinate these activities, the current vegetation management plan for the campgrounds needs to be updated to include plans for dwarf mistletoe and hazard tree management. Specific treatments for areas infested with dwarf mistletoe need to be identified, together with a plan to reduce the incidence of hazard trees. Continued management of the mountain pine and spruce beetle infestations should also be addressed. The plan also needs to include a specific timetable for all proposed management activities. All three of the resource staffs mentioned previously should be involved in updating the plan. With the exception of mountain pine beetle and spruce beetle, management of the other minor insect and disease problems need not be addressed unless they begin to cause widespread mortality (not a likely situation) or affect the hazard tree situation. Again, the presence of these minor problems can be exploited for their educational value.

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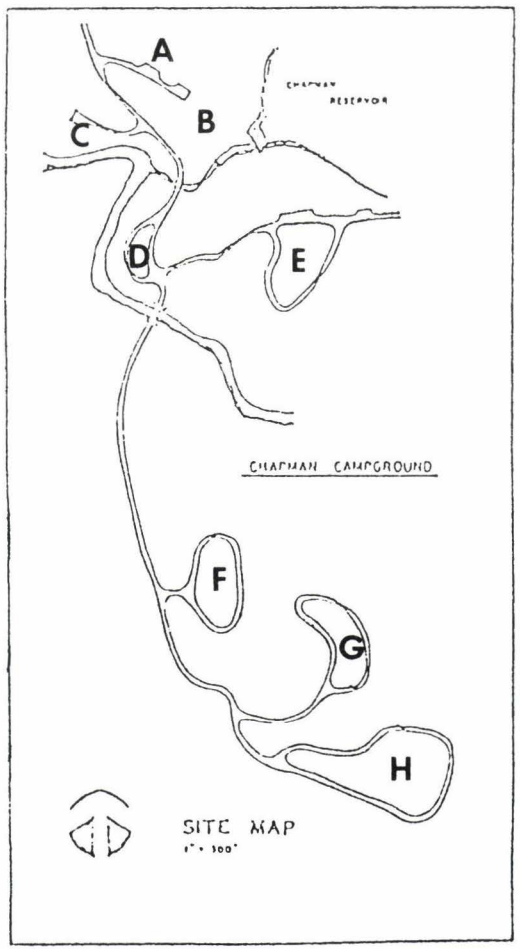
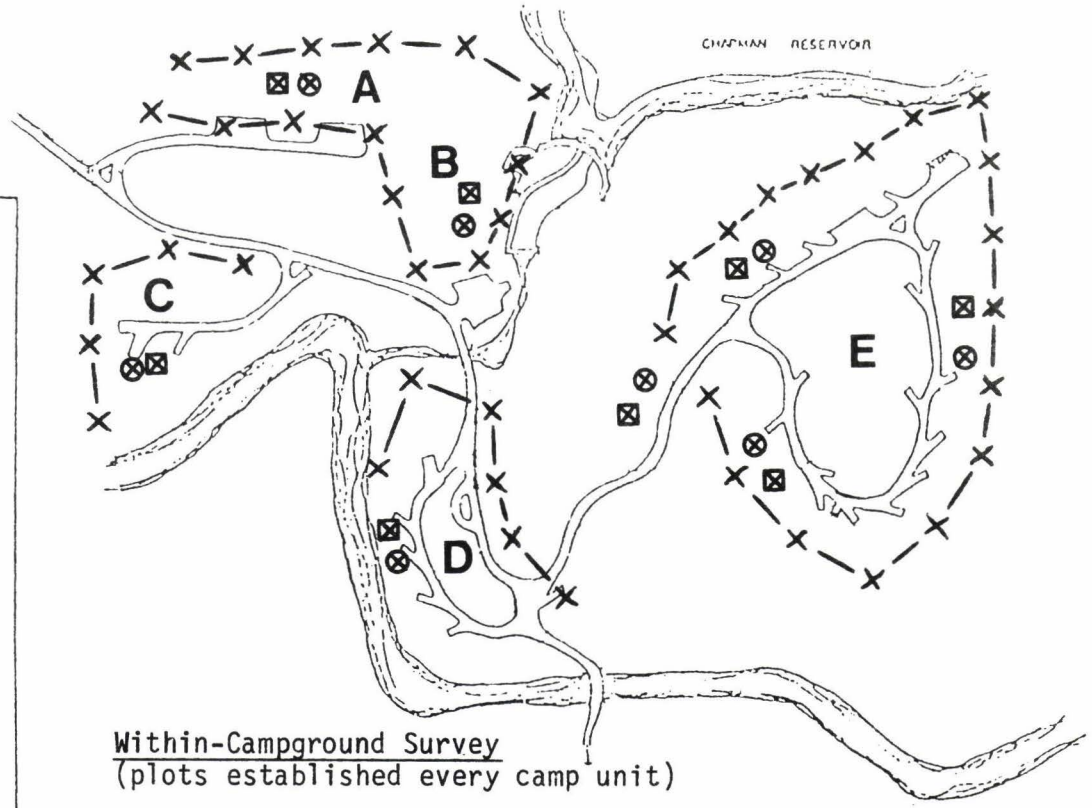
APPENDIX A

Within- and outside-campground survey plot locations at the lower loops (A-E) of Chapman campground, Sopris District, White River National Forest.

Within- and Outside-Campground Survey Plot Locations
At The Lower Loops of Chapman Campground.



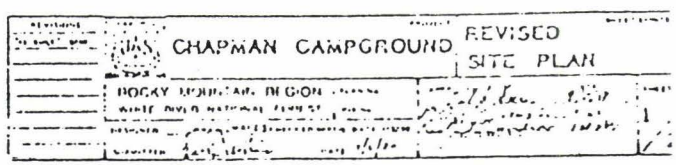


Within-Campground Survey
(plots established every camp unit)

⊗ = Interior plot center
⊠ = Inter-unit plot center

Outside-Campground Survey
(plot centers 2 chains apart)

X = Outside-campground plot center



APPENDIX B

Within-campground survey form used to assess insect, disease, and hazard tree conditions at Chapman, Chapman Group and Elk Wallow campgrounds.

INSIDE-CAMPGROUND SURVEY

Forest:_____ District:_____ Campground:_____
Date Of Inspection:_____ Evaluated By:_____
Unit No.:_____
Interior Plot:_____ Inter-Unit Plot: _____ Between Campsites:_____
Habitat Type:_____ Understory Vegetation:_____

Tree No.									
Species									
DBH									
Crown Ratio									
DM Rating									
Root Disease									
Stem Decay									
Internal Decay (Sound/Drill/Core)									
Cankers									
Rust									
Human Damage									
Defoliating Insects (% Defoliation)									
Bark Beetles									
Other Insects									
Hazards									

Regeneration Plots (# trees of each spp. <5" DBH, # trees of each spp. >2', <2' tall)

Plot 1. (Left)

Plot 2. (Right)

APPENDIX C

Outside-campground survey form used to assess insect, disease, and hazard tree conditions at Chapman, Chapman Group and Elk Wallow campgrounds.

OUTSIDE-CAMPGROUND SURVEY

Forest:_____ District:_____ Campground:_____

Date Of Inspection:_____ Evaluated By:_____

Plot No.:_____ Slope:_____ Aspect:_____

Habitat Type:_____ Understory Vegetation:_____

Tree No.									
Species									
DBH									
Crown Ratio									
DM Rating									
Root Disease									
Stem Decay									
Internal Decay (Sound/Drill/Core)									
Cankers									
Rust									
Defoliating Insects (% Defoliation)									
Bark Beetles									
Other Insects									
Notes									

APPENDIX D

Results of insect, disease and hazard tree surveys
at Chapman, Chapman Group, and Elk Wallow campgrounds,
Sopris District, White River National Forest.

LPP= Lodgepole pine (Pinus contorta)
SP= Colorado blue spruce (Picea pungens) or
Engelmann spruce (Picea engelmannii)
ASP= Quaking aspen (Populus tremuloides)
DF= Douglas-fir (Pseudotsuga menziesii)
WF= White fir (Abies concolor)
WIL= Willow (Salix sp.)

1. STAND DESCRIPTION

		SPECIES COMPOSITION (%)						BASAL AREA (ft^2/ac)						TREES PER ACRE					
		LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT
LOOPS A-C	Inside CG:																		
	Interior	100	0	0	0	0	---	139.1	0	0	0	0	139.1	307	0	0	0	0	307
	Inter-Unit	98	2	0	0	0	---	122.6	3.0	0	0	0	125.6	307	7	0	0	0	314
	Pooled	99	1	0	0	0	---	130.8	1.5	0	0	0	132.3	307	3	0	0	0	310
	Outside CG:	97	3	0	0	0	---	59.0	2.0	0	0	0	61.0	146	1	0	0	0	147
LOOPS D-E	Inside CG:																		
	Interior	99	1	0	0	0	---	91.1	1.8	0	0	0	92.9	237	3	0	0	0	240
	Inter-Unit	98	2	0	0	0	---	99.1	1.0	0	0	0	100.1	196	4	0	0	0	200
	Pooled	98	2	0	0	0	---	94.8	1.4	0	0	0	96.2	218	4	0	0	0	222
	Outside CG:	96	4	0	0	0	---	74.4	3.2	0	0	0	77.6	176	11	0	0	0	187
LOOP F	Inside CG:																		
	Interior	69	0	31	0	0	---	58.0	0	6.7	0	0	64.8	45	0	20	0	0	65
	Inter-Unit	71	3	26	0	0	---	75.5	1.3	13.8	0	0	90.6	110	5	40	0	0	155
	Pooled	70	2	27	0	0	---	66.8	0.6	10.3	0	0	77.7	78	2	30	0	0	110
	Outside CG:	43	47	10	0	0	---	31.4	34.3	7.1	0	0	72.9	57	65	33	0	0	155
LOOP G	Inside CG:																		
	Interior	83	0	17	0	0	---	26.4	0	3.0	0	0	29.4	33	0	7	0	0	40
	Inter-Unit	100	0	0	0	0	---	91.3	0	0	0	0	91.3	113	0	0	0	0	113
	Pooled	96	0	4	0	0	---	58.8	0	1.5	0	0	60.3	74	0	3	0	0	77
	Outside CG:	62	29	8	0	1	---	73.3	34.4	8.9	0	1.1	117.8	125	77	20	0	2	224

1. STAND DESCRIPTION (CONT.)

		SPECIES COMPOSITION (%)						BASAL AREA (ft^2/ac)						TREES PER ACRE					
		LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT
LOOP H	Inside CG:																		
	Interior	100	0	0	0	0	---	75.7	0	0	0	0	75.7	127	0	0	0	0	127
	Inter-Unit	81	19	0	0	0	---	139.0	12.2	0	0	0	151.2	193	47	0	0	0	240
	Pooled	87	13	0	0	0	---	107.3	6.1	0	0	0	113.4	160	23	0	0	0	183
	Outside CG:	63	9	26	2	0	---	39.0	5.7	16.2	1.0	0	61.9	64	24	51	5	0	144
LOOPS A-E (LOWER LOOPS)	Inside CG:																		
	Interior	99	1	0	0	0	---	107.1	1.2	0	0	0	108.3	260	2	0	0	0	262
	Inter-Unit	98	2	0	0	0	---	107.9	1.7	0	0	0	109.7	238	5	0	0	0	243
	Pooled	99	1	0	0	0	---	107.5	1.5	0	0	0	109.0	249	4	0	0	0	253
	Outside CG:	96	4	0	0	0	---	67.6	2.7	0	0	0	70.2	163	7	0	0	0	170
LOOPS F-H (UPPER LOOPS)	Inside CG:																		
	Interior	87	0	13	0	0	---	53.8	0	3.6	0	0	57.4	66	0	10	0	0	76
	Inter-Unit	81	10	10	0	0	---	99.3	4.2	5.5	0	0	109.0	136	16	16	0	0	168
	Pooled	83	7	11	0	0	---	76.6	2.1	4.6	0	0	83.2	101	8	13	0	0	122
	Outside CG:	57	29	14	0.5	0.5	---	49.8	24.9	11.8	0.4	0.4	87.3	85	57	37	1	2	182
LOOPS A-H (TOTAL CAMPGROUND)	Inside CG:																		
	Interior	96	0.6	3	0	0	---	79.1	0.6	1.9	0	0	81.5	158	1	5	0	0	164
	Inter-Unit	90	6	4	0	0	---	103.1	3.1	3.1	0	0	109.3	181	11	9	0	0	201
	Pooled	93	3	4	0	0	---	90.8	1.8	2.5	0	0	95.0	169	6	7	0	0	182
	Outside CG:	74	18	8	0.3	0.3	---	58.3	14.3	6.2	0.2	0.2	79.1	123	33	19	0.4	1	176

1. STAND DESCRIPTION (CONT.)

		SPECIES COMPOSITION (%)						BASAL AREA (ft^2/ac)						TREES PER ACRE					
		LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT
CHAPMAN GROUP CAMP	Inside CG:																		
	Interior	100	0	0	0	0	---	56.6	0	0	0	0	56.6	80	0	0	0	0	80
	Inter-Unit	100	0	0	0	0	---	34.4	0	0	0	0	34.4	40	0	0	0	0	40
	Pooled	100	0	0	0	0	---	45.5	0	0	0	0	45.5	60	0	0	0	0	60
	Outside CG:	100	0	0	0	0	---	52.0	0	0	0	0	52.0	176	0	0	0	0	176
ELK WALLOW C.G.	Inside CG:																		
	Interior	100	0	0	0	0	---	117.1	0	0	0	0	117.1	93	0	0	0	0	93
	Inter-Unit	100	0	0	0	0	---	25.1	0	0	0	0	25.1	27	0	0	0	0	27
	Pooled	100	0	0	0	0	---	71.1	0	0	0	0	71.1	60	0	0	0	0	60
	Outside CG:	62	13	25	0	0	---	8.3	1.7	3.3	0	0	13.2	11	1	12	0	0	25

2. HAZARD AND DWARF MISTLETOES

		AVERAGE HAZARD RATING (0-9=Low, 10-20=Medium, 21-27=High)						% HAZARD RATING			DWARF MISTLETOES % INFECTION		DWARF MISTLETOES DMR	
		LPP	SP	ASP	DF	WF	TOT	HIGH	MED	LOW	LPP	TOTAL	LPP	STAND
LOOPS A-C	Inside CG:													
	Interior	15.1	--	---	--	--	15.1	2	80	17	0	0	0	0
	Inter-Unit	13.1	0	---	--	--	12.8	4	66	30	0	0	0	0
	Pooled	14.1	0	---	--	--	13.9	3	73	24	0	0	0	0
	Outside CG:	XXXX	XXX	XXX	XXX	XXX	XXXX	XX	XX	XX	5	5	2.3	0.1
LOOPS D-E	Inside CG:													
	Interior	16.5	18.0	---	--	--	16.5	0	92	8	48	47	3.5	1.6
	Inter-Unit	15.1	18.0	---	--	--	15.1	4	78	18	55	54	2.9	1.5
	Pooled	15.9	18.0	---	--	--	15.9	2	86	12	51	50	3.2	1.6
	Outside CG:	XXXX	XXX	XXX	XXX	XXX	XXXX	XX	XX	XX	19	19	2.6	0.5
LOOP F	Inside CG:													
	Interior	14.0	--	22.5	--	--	16.6	15	69	15	22	15	3.5	0.5
	Inter-Unit	11.5	0	23.6	--	--	12.2	29	35	35	0	0	0	0
	Pooled	12.2	0	23.3	--	--	14.9	25	45	9	6	5	3.5	0.2
	Outside CG:	XXXX	XXX	XXX	XXX	XXX	XXXX	XX	XX	XX	5	2	3.0	0.1
LOOP G	Inside CG:													
	Interior	10.8	--	27.0	--	--	13.5	17	50	33	40	0	1.5	0.5
	Inter-Unit	9.0	--	---	--	--	9.0	6	41	53	0	0	0	0
	Pooled	9.4	--	27.0	--	--	10.2	9	43	47	9	0	1.5	0.1
	Outside CG:	XXXX	XXX	XXX	XXX	XXX	XXXX	XX	XX	XX	2	1	3.0	.03

2. HAZARD AND DWARF MISTLETOES (CONT.)

		AVERAGE HAZARD RATING (0-9=Low, 10-20=Medium, 21-27=High)						% HAZARD RATING			DWARF MISTLETOES % INFECTION		DMR	
		LPP	SP	ASP	DF	WF	TOT	HIGH	MED	LOW	LPP	TOTAL	LPP	STAND
LOOP H	Inside CG:													
	Interior	15.6	--	---	--	--	15.6	5	79	16	0	0	0	0
	Inter-Unit	9.3	--	---	--	--	7.5	0	42	58	0	0	0	0
	Pooled	11.8	0	---	--	--	10.3	2	55	44	0	0	0	0
	Outside CG:	XXXX	XXX	XXX	XXX	XXX	XXXX	XX	XX	XX	0	0	0	0
LOOPS A-E (LOWER LOOPS)	Inside CG:													
	Interior	15.9	18.0	---	--	--	15.9	1	87	12	29	29	3.5	1.0
	Inter-Unit	14.1	9.0	---	--	--	14.0	4	72	24	28	28	2.9	0.8
	Pooled	15.0	12.0	---	--	--	15.1	2	80	17	29	28	3.2	0.9
	Outside CG:	XXXX	XXX	XXX	XXX	XXX	XXXX	XX	XX	XX	14	13	2.6	0.3
LOOPS F-H (UPPER LOOPS)	Inside CG:													
	Interior	14.5	---	23.4	--	--	15.6	11	71	18	12	11	2.5	0.3
	Inter-Unit	9.9	0	23.6	--	--	10.3	12	39	49	0	0	0	0
	Pooled	11.4	0	23.5	--	--	12.0	11	49	39	4	3	2.5	0.1
	Outside CG:	XXXX	XXX	XXX	XXX	XXX	XXXX	XX	XX	XX	2	1	3.0	.03
LOOPS A-H (TOTAL CAMPGROUND)	Inside CG:													
	Interior	15.6	18.0	23.4	--	--	15.9	3	83	13	25	24	3.4	0.8
	Inter-Unit	12.4	1.8	23.6	--	--	12.3	8	57	35	17	15	2.9	0.4
	Pooled	13.9	3.3	23.6	--	--	13.9	6	69	25	21	19	3.2	0.6
	Outside CG:	XXXX	XXX	XXX	XXX	XXX	XXXX	XX	XX	XX	8	6	2.6	0.2

2. HAZARD AND DWARF MISTLETOES (CONT.)

		AVERAGE HAZARD RATING (0-9=Low, 10-20=Medium, 21-27=High)						% HAZARD RATING			DWARF MISTLETOES % INFECTION		DMR	
		LPP	SP	ASP	DF	WF	TOT	HIGH	MED	LOW	LPP	TOTAL	LPP	STAND
CHAPMAN GROUP CAMP	Inside CG:													
	Interior	13.5	--	---	--	--	13.5	17	50	33	0	0	0	0
	Inter-Unit	18.0	--	---	--	--	18.0	0	100	0	0	0	0	0
	Pooled	15.0	--	---	--	--	15.0	11	67	22	0	0	0	0
	Outside CG:	XXXX	XXX	XXX	XXX	XXX	XXXX	XX	XX	XX	0	0	0	0
ELK WALLOW C.G.	Inside CG:													
	Interior	18.6	--	---	--	--	18.6	7	93	0	0	0	0	0
	Inter-Unit	9.0	--	---	--	--	9.0	0	50	50	0	0	0	0
	Pooled	16.5	--	---	--	--	16.5	6	83	11	0	0	0	0
	Outside CG:	XXXX	XXX	XXX	XXX	XXX	XXXX	XX	XX	XX	0	0	0	0

3. DISEASES AND INSECTS

		PERCENT WITH ROOT DISEASE						PERCENT WITH STEM DECAY						PERCENT WITH CANKERS					
		LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT
LOOPS A-C	Inside CG:																		
	Interior	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Inter-Unit	0	0	---	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
	Pooled	0	0	---	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
	Outside CG:	0	0	---	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
LOOPS D-E	Inside CG:																		
	Interior	0	0	---	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
	Inter-Unit	0	0	---	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
	Pooled	0	0	---	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
	Outside CG:	0	0	---	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
LOOP F	Inside CG:																		
	Interior	0	--	0	--	--	0	0	0	50	--	--	15	0	--	50	--	--	15
	Inter-Unit	0	0	0	--	--	0	0	0	75	--	--	19	0	0	9	--	--	6
	Pooled	0	0	0	--	--	0	0	0	67	--	--	18	0	0	33	--	--	9
	Outside CG:	0	0	0	--	--	0	0	5	40	--	--	6	0	0	0	--	--	0
LOOP G	Inside CG:																		
	Interior	0	--	0	--	--	0	0	--	100	--	--	17	0	--	0	--	--	0
	Inter-Unit	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Pooled	0	--	0	--	--	0	0	--	100	--	--	4	0	--	0	--	--	0
	Outside CG:	0	0	0	--	0	0	0	0	38	--	0	3	0	0	0	--	0	0

3. DISEASES AND INSECTS (CONT.)

		PERCENT WITH ROOT DISEASE						PERCENT WITH STEM DECAY						PERCENT WITH CANKERS					
		LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT
LOOP H	Inside CG:																		
	Interior	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Inter-Unit	0	0	---	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
	Pooled	0	0	---	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
	Outside CG:	0	0	0	0	--	0	0	0	24	0	--	6	0	0	0	0	--	0
LOOPS A-E (LOWER LOOPS)	Inside CG:																		
	Interior	0	0	--	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
	Inter-Unit	0	0	--	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
	Pooled	0	0	--	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
	Outside CG:	0	0	--	--	--	0	0	0	---	--	--	0	0	0	---	--	--	0
LOOPS F-H (UPPER LOOPS)	Inside CG:																		
	Interior	0	--	0	--	--	0	0	--	60	--	--	8	0	--	40	--	--	5
	Inter-Unit	0	0	0	--	--	0	0	0	75	--	--	71	0	0	25	--	--	2
	Pooled	0	0	0	--	--	0	0	0	69	--	--	74	0	0	31	--	--	3
	Outside CG:	0	0	0	0	0	0	0	1	28	0	0	4	0	0	0	0	0	0
LOOPS A-H (TOTAL CAMPGROUND)	Inside CG:																		
	Interior	0	0	0	--	--	0	0	0	60	--	--	2	0	0	40	--	--	1
	Inter-Unit	0	0	0	--	--	0	0	0	75	--	--	3	0	0	25	--	--	1
	Pooled	0	0	0	--	--	0	0	0	69	--	--	3	0	0	31	--	--	1
	Outside CG:	0	0	0	0	0	0	0	0.3	28	0	0	2	0	0	0	0	0	0

3. DISEASES AND INSECTS (CONT.)

		PERCENT WITH ROOT DISEASE						PERCENT WITH STEM DECAY						PERCENT WITH CANKERS					
		LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT
CHAPMAN GROUP CAMP	Inside CG:																		
	Interior	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Inter-Unit	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Pooled	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Outside CG:	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
ELK WALLOW C.G.	Inside CG:																		
	Interior	0	--	---	--	--	0	7	--	---	--	--	7	0	--	---	--	--	0
	Inter-Unit	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Pooled	0	--	---	--	--	0	6	--	---	--	--	6	0	--	---	--	--	0
	Outside CG:	0	0	0	--	--	0	0	0	0	--	--	0	0	0	50	--	--	13

3. DISEASES AND INSECTS (CONT.)

		PERCENT WITH RUST DISEASE						PERCENT WITH DEFOLIATING INSECTS						PERCENT WITH BARK BEETLES					
		LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT
LOOPS A-C	**Inside CG:**																		
	Interior	4	--	---	--	--	4	0	--	---	--	--	0	0	--	---	--	--	0
	Inter-Unit	2	0	---	--	--	2	0	0	---	--	--	0	0	0	---	--	--	0
	Pooled	3	0	---	--	--	3	0	0	---	--	--	0	0	0	---	--	--	0
	Outside CG:	3	0	---	--	--	3	0	0	---	--	--	0	1	0	---	--	--	1
LOOPS D-E	**Inside CG:**																		
	Interior	4	0	---	--	--	4	0	0	---	--	--	0	1	0	---	--	--	1
	Inter-Unit	6	0	---	--	--	6	0	0	---	--	--	0	0	0	---	--	--	0
	Pooled	5	0	---	--	--	5	0	0	---	--	--	0	0	0	---	--	--	0
	Outside CG:	18	25	---	--	--	19	0	0	---	--	--	0	0	0	---	--	--	0
LOOP F	**Inside CG:**																		
	Interior	11	--	0	--	--	8	0	--	0	--	--	0	0	--	0	--	--	0
	Inter-Unit	27	0	0	--	--	19	0	0	0	--	--	0	9	0	0	--	--	6
	Pooled	23	0	0	--	--	16	0	0	0	--	--	0	6	0	0	--	--	5
	Outside CG:	23	8	0	--	--	14	0	0	0	--	--	0	0	4	0	--	--	2
LOOP G	**Inside CG:**																		
	Interior	20	--	0	--	--	17	0	--	0	--	--	0	0	--	0	--	--	0
	Inter-Unit	65	--	--	--	--	65	0	--	--	--	--	0	0	--	--	--	--	0
	Pooled	55	--	0	--	--	52	0	--	0	--	--	0	0	--	0	--	--	0
	Outside CG:	55	20	0	--	0	40	0	0	0	--	0	0	0	3	0	--	0	1

3. DISEASES AND INSECTS (CONT.)

		PERCENT WITH RUST DISEASE						PERCENT WITH DEFOLIATING INSECTS						PERCENT WITH BARK BEETLES					
		LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT
LOOP H	Inside CG:																		
	Interior	42	--	---	--	--	42	0	--	---	--	--	0	0	--	---	--	--	0
	Inter-Unit	38	0	---	--	--	31	0	0	---	--	--	0	0	0	---	--	--	0
	Pooled	40	0	---	--	--	35	0	0	---	--	--	0	0	0	---	--	--	0
	Outside CG:	34	17	0	0	--	23	0	0	0	0	--	0	0	0	0	0	--	0
LOOPS A-E (LOWER LOOPS)	Inside CG:																		
	Interior	4	0	---	--	--	4	0	0	---	--	--	0	1	0	---	--	--	1
	Inter-Unit	4	0	---	--	--	4	0	0	---	--	--	0	0	0	---	--	--	0
	Pooled	4	0	---	--	--	4	0	0	---	--	--	0	0.5	0	---	--	--	0.5
	Outside CG:	13	17	---	--	--	13	0	0	---	--	--	0	1	0	---	--	--	1
LOOPS F-H (UPPER LOOPS)	Inside CG:																		
	Interior	30	--	0	--	--	26	0	--	0	--	--	0	0	--	0	--	--	0
	Inter-Unit	41	0	0	--	--	33	0	0	0	--	--	0	3	0	0	--	--	2
	Pooled	38	0	0	--	--	31	0	0	0	--	--	0	2	0	0	--	--	2
	Outside CG:	42	15	0	0	0	28	0	0	0	0	0	0	0	3	0	0	0	1
LOOPS A-H (TOTAL CAMPGROUND)	Inside CG:																		
	Interior	10	0	0	--	--	10	0	0	0	--	--	0	1	0	0	--	--	1
	Inter-Unit	20	0	0	--	--	18	0	0	0	--	--	0	1	0	0	--	--	1
	Pooled	15	0	0	--	--	14	0	0	0	--	--	0	1	0	0	--	--	1
	Outside CG:	26	15	0	--	--	22	0	0	0	--	--	0	0.3	3	0	--	--	1

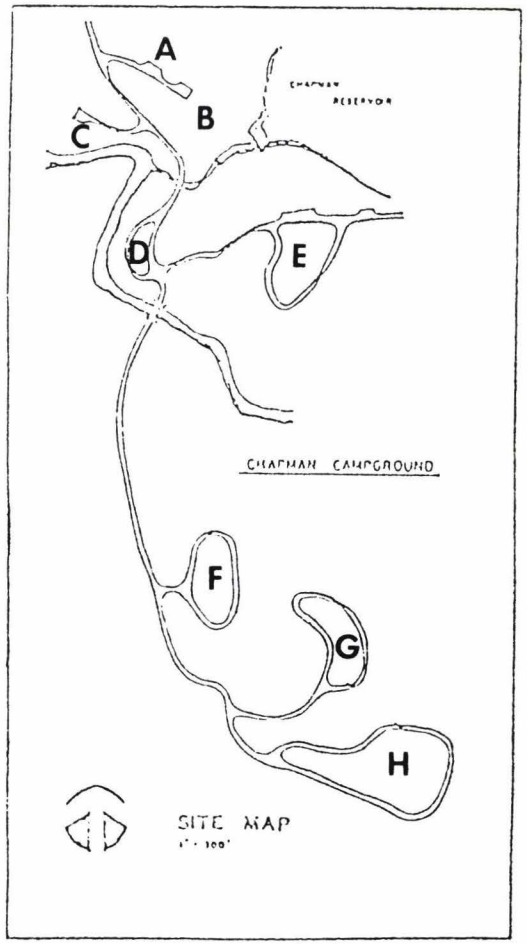
3. DISEASES AND INSECTS (CONT.)

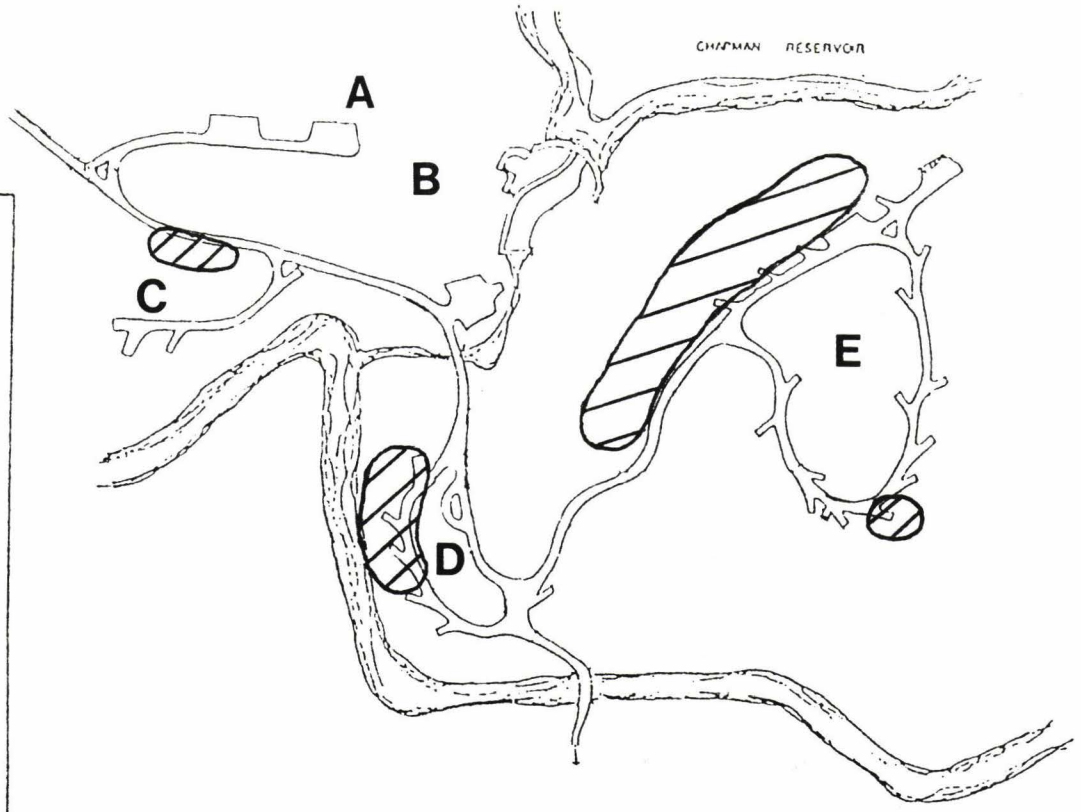
		PERCENT WITH RUST DISEASE						PERCENT WITH DEFOLIATING INSECTS						PERCENT WITH BARK BEETLES					
		LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT	LPP	SP	ASP	DF	WF	TOT
CHAPMAN GROUP CAMP	Inside CG:																		
	Interior	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Inter-Unit	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Pooled	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Outside CG:	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
ELK WALLOW C.G.	Inside CG:																		
	Interior	0	--	---	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Inter-Unit	0	--	--	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Pooled	0	--	--	--	--	0	0	--	---	--	--	0	0	--	---	--	--	0
	Outside CG:	0	0	0	--	--	0	0	0	0	--	--	0	0	0	0	--	--	0

APPENDIX E

Locations of dwarf mistletoe centers in
Chapman campground, Sopris District,
White River National Forest.

Figure 1. Lower Loops (A-E) of Chapman Campground,
Sopris District, White River N.F.



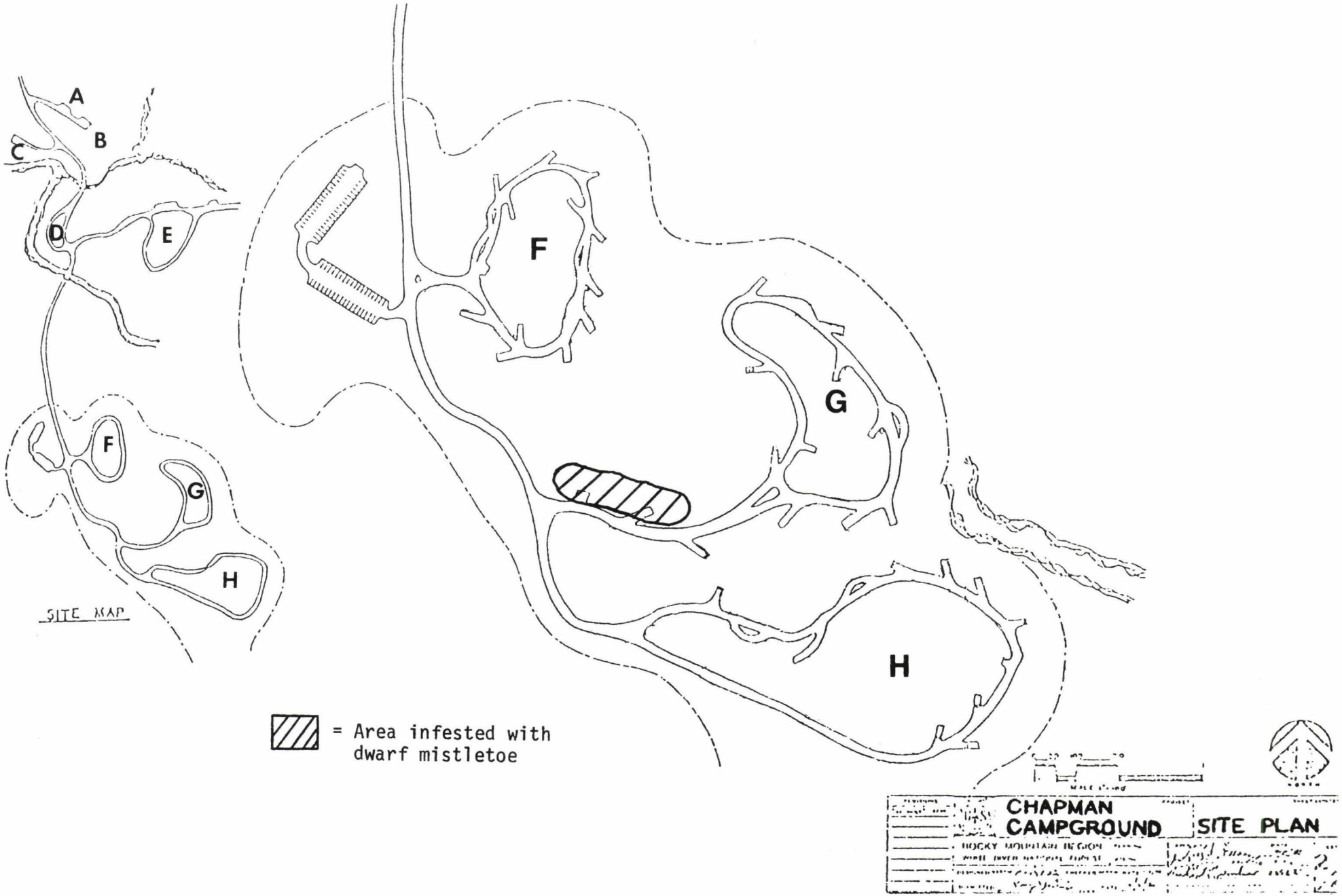


= Area infested with dwarf mistletoe

CHAPMAN CAMPGROUND REVISED SITE PLAN

ROCKY MOUNTAIN REGION

Figure 2. Upper Loops (F-H) of Chapman Campground, Sopris District, White River N.F.



4. REGENERATION SURVEY

		LPP	SP	ASP	WIL	TOTAL
LOOPS A-C (83% of plots had no regen.)	# Trees Per Acre	400	0	0	0	400
	% Of Total Regeneration	100	0	0	0	---
	# Trees Per Acre >2' Tall	250	0	0	0	250
	% Trees Per Acre >2' Tall	63	0	0	0	63
	# Trees Per Acre <2' Tall	150	0	0	0	150
	% Trees Per Acre <2' Tall	37	0	0	0	37

		LPP	SP	ASP	WIL	TOTAL
LOOPS D-E (30% of plots had no regen.)	# Trees Per Acre	210	30	420	300	960
	% Of Total Regeneration	22	3	44	31	---
	# Trees Per Acre >2' Tall	120	30	420	300	120
	% Trees Per Acre >2' Tall	57	100	100	100	91
	# Trees Per Acre <2' Tall	90	0	0	0	90
	% Trees Per Acre <2' Tall	43	0	0	0	9

		LPP	SP	ASP	WIL	TOTAL
LOOP F (75% of plots had no regen.)	# Trees Per Acre	0	0	750	0	750
	% Of Total Regeneration	0	0	100	0	---
	# Trees Per Acre >2' Tall	0	0	750	0	750
	% Trees Per Acre >2' Tall	0	0	100	0	100
	# Trees Per Acre <2' Tall	0	0	0	0	0
	% Trees Per Acre <2' Tall	0	0	0	0	0

		LPP	SP	ASP	WIL	TOTAL
LOOP G (17% of plots had no regen.)	# Trees Per Acre	200	0	1750	200	2150
	% Of Total Regeneration	9	0	81	9	---
	# Trees Per Acre >2' Tall	200	0	1750	200	2150
	% Trees Per Acre >2' Tall	100	0	100	100	100
	# Trees Per Acre <2' Tall	0	0	0	0	0
	% Trees Per Acre <2' Tall	0	0	0	0	0

4. REGENERATION SURVEY (CONT.)

		LPP	SP	ASP	WIL	TOTAL
LOOP H	# Trees Per Acre	350	200	0	250	800
33% of	% Of Total Regeneration	44	25	0	31	---
plots had						
no regen.)	# Trees Per Acre >2' Tall	350	200	0	250	800
	% Trees Per Acre >2' Tall	100	100	0	100	100
	# Trees Per Acre <2' Tall	0	0	0	0	0
	% Trees Per Acre <2' Tall	0	0	0	0	0

		LPP	SP	ASP	WIL	TOTAL
LOOPS A-E	# Trees Per Acre	281	19	263	187	750
(50% of	% Of Total Regeneration	38	2	35	25	---
plots had						
no regen.)	# Trees Per Acre >2' Tall	169	19	263	187	638
	% Trees Per Acre >2' Tall	60	100	100	100	85
	# Trees Per Acre <2' Tall	112	0	0	0	112
	% Trees Per Acre <2' Tall	40	0	0	0	15

		LPP	SP	ASP	WIL	TOTAL
LOOPS F-H	# Trees Per Acre	165	60	825	135	1185
(45% of	% Of Total Regeneration	14	5	70	11	---
plots had						
no regen.)	# Trees Per Acre >2' Tall	165	60	825	135	1185
	% Trees Per Acre >2' Tall	100	100	100	100	100
	# Trees Per Acre <2' Tall	0	0	0	0	0
	% Trees Per Acre <2' Tall	0	0	0	0	0

		LPP	SP	ASP	WIL	TOTAL
LOOPS A-H	# Trees Per Acre	217	42	575	158	992
(47% of	% Of Total Regeneration	22	4	58	16	---
plots had						
no regen.)	# Trees Per Acre >2' Tall	167	42	575	158	942
	% Trees Per Acre >2' Tall	77	100	100	100	95
	# Trees Per Acre <2' Tall	50	0	0	0	50
	% Trees Per Acre <2' Tall	23	0	0	0	5

4. REGENERATION SURVEY (CONT.)

		LPP	SP	ASP	WIL	TOTAL
CHAPMAN GROUP CAMP	# Trees Per Acre	50	0	0	0	50
	% Of Total Regeneration	100	0	0	0	---
(83% of plots had no regen.)	# Trees Per Acre >2' Tall	50	0	0	0	50
	% Trees Per Acre >2' Tall	100	0	0	0	100
	# Trees Per Acre <2' Tall	0	0	0	0	0
	% Trees Per Acre <2' Tall	0	0	0	0	0

		LPP	SP	ASP	WIL	TOTAL
ELK WALLOW C.G.	# Trees Per Acre	0	0	150	0	150
	% Of Total Regeneration	0	0	100	0	---
(83% of plots had no regen.)	# Trees Per Acre >2' Tall	0	0	150	0	150
	Trees Per Acre >2' Tall	0	0	100	0	100
	# Trees Per Acre <2' Tall	0	0	0	0	0
	% Trees Per Acre <2' Tall	0	0	0	0	0